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December 16, 1991

Potential NSNF Weapons Concepts for the 21st Century (U)

Perspectives, Warhead Technologies, and Delivery System Concepts

Briefing to Joint Defense Policy Board/Defense Science Board Task Force on Non-Strategic Nuclear Forces
December 17-18, 1991

Redaction Required
[SRD (N)]
UCNI

LOS ALAMOS
01878899

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW-DATE: 10/27/2006
AUTHORITY: ☐DOE ☒DOD
NAME: Lilly Hargrave
2ND REVIEW-DATE: 4/20/09
AUTHORITY: ☐DOE ☒DOD
NAME: Phil Arnidt
DETERMINATION [CIRCLE NUMBER(S)]
1. CLASSIFICATION RETAINED
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
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5. CLASSIFICATION CANCELLED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY): Does not contain UCNI

1A - William Daitch, DNA
2A - J. S. Howard, A-5, MS F602
3A - T. P. Seitz, NWT-WP, MS F633
4A - CRM-4, MS A150
5A - A-5 File

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CRITICAL NUCLEAR WEAPON DESIGN INFORMATION - DOD DIRECTIVE 5210.2 APPLIES

Sandia — Los Alamos

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DERIVATIVE CLASSIFIER

J. S. Howard
Name

Staff Member, A-5
Title & Organization

RESTRICTED DATA

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NSNF Briefing Overview

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December 16, 1991

Perspectives-

- Commitments to NATO
- Future 3d World Nuclear-Armed Adversaries
- Instability & Spillovers from Soviet Union Dissolution
- Deterrence & Insurance over Far-Term of 50+ Years

Warhead Technologies-

- Safety Enhancements
- Flexible and Modular Designs:
  Fieldable Prototypes
- Low Yield Designs

Delivery System Concepts -

- Stealthy Stand Off Bomb
- Tactical Earth Penetrating Weapon
- Convertible Torpedo
- ASRAM
- Air-Launched Precision Strike Weapon

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Perspectives on NSNF - I

WHY: ***Forward-Deployed Commitments to NATO***

- **Preclude Proliferation via Extended Deterrence Guarantees and Programs of Cooperation**
- **Ensure Deterrence as Weapons of Last Resort**
- **Promote Stability with US Presence in Post-Cold War Europe**

HOW:

100s of Air-Delivered Systems in Europe

TECHNOLOGIES:

B61 Stockpile Improvement Programs

New Delivery Concepts

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Perspectives on NSNF - II

WHY: ***Deterrence of Future 3d World Nuclear States***

- **Provide Credible Regional Deterrence with Appropriate Options**
- **Preclude Sanctuary to Nuclear-Armed Leadership**
- **Protect Deployed US Forces**

HOW:

CONUS Contingency Force of Low Yield Systems

TECHNOLOGIES:

Very Low Yield Earth Penetrator Weapon
Low Yield Anti-Theater Ballistic Missile
Low Yield Air-Delivered Stand-off Missile

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Perspectives on NSNF - III

WHY: ***Insurance to Counter Post-USSR NSNF***

- Counter Russian Civil War Spillovers and Loss of Central Nuclear Control
- Deter Resurgent Russian Imperialism Armed with Nuclear Weapons

HOW:

Air-Delivered Weapons in Europe

CONUS Air- & Sea-Launched Forces

TECHNOLOGIES

Common Strategic & Non-Strategic Stand-off Air Munition

Maritime Bomb & ASW Options

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Perspectives on NSNF - IV

WHY: ***Stability, Insurance, Deterrence over the Far Term***

- **Proliferation Control through Extended Non-Strategic Deterrence**
- **Balance "Pre-Strategic", "Sub-Strategic", and Tactical Weapons Possessed by Other Industrial Nations**
- **Guard against Technological Surprise in Unpredictable Future**

HOW:

Limited Builds and Prototyping

Maintenance of Core Competence

TECHNOLOGIES

Supersafe Designs

Advanced Designs & Materials

Perspectives:

The President's Initiatives will Change the Deterrent, Challenge the Complex, and Demand a New Role and Impact from RD&T

- Stand-down of many alert forces
- Environmentally sound, low-cost destruction of many weapons, with few new builds
- Dramatic reductions in deployed US and Soviet weapons, plus increased concern for weapons and SNM in post-USSR and other countries
- Deterrence, role of nuclear weapons will evolve
  - Some current weapons will be adequate for the near-term, others will not, BUT

Nuclear Deterrence Remains a Cornerstone of National Security Policy

Nuclear Warhead Technologies will Remain an Important Component of Evolving National Strategies

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Enhanced Surety in a Graded Approach: a Guiding Principle will be Stockpile Stability for 50+ Years

We Will Emphasize:

- **A "Common Pit" for the B61 and W80 families providing IHE, fire resistance, pit reuse, and other features such as laser initiation**
- **Small Builds and Fieldable Prototypes**
- **Supersafe primary designs, e.g., a Pu-free primary for the ALCM/ACM, B61**
- **A new IHE (LAX-112) with energy density nearly equal to conventional high explosive**
- **Predictive capability for nuclear safety in abnormal environments**

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

PIT REUSE

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DOE 6.2 (a)

MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST) EXAMPLE: CONVERSION OF W91 TECHNOLOGY FOR MULTIUSE

* **Goal: Sandia, Los Alamos, and the production agencies develop and prototype a warhead system and modern primary with enhanced surety features and ES&H compliant safing, arming and firing technologies for future SIPs and warhead development programs**
  - B61-3/4/10
  - Stand-off Bomb
  - Dual Capable Bomb
  - Tactical Air-to-Surface Missile
  - Minuteman III Missile
  - HPRF
* **Major Tasks**
  - Integrate System Requirements
  - UGT Demonstration
  - Establish Environmental Capability
  - Produce Functional Proof-of-Concept Hardware
  - Establish Production Processes

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST) APPLICATIONS

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

MULTIPLE-APPLICATION SURETY TECHNOLOGY (MAST) FEATURES

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DOE 6.2a

Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Deterrence by Capability: Fieldable Prototypes and Small Builds – A new concept for consideration

Why?

- **Flexible response in a changing world**
  - **Future builds will not be as large as before**
  - **Broader military requirements**
- **DoD thinking provides the technological imperative**
  - **How to maintain the defense industrial base**
  - **Change the culture from "big program" = success**
  - **R&D has big role in "deterrence by capability" and in reconstitution**
- **Linkage with future of DOE infrastructure**
  - **Smaller, more flexible complex**
  - **Small builds and fieldable prototypes help maintain capability between larger production runs**

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Warhead Technologies: Safety / Flexible & Modular Designs: Fieldable Prototypes

Pu-Free Design Concept -- A Supersafe Initiative (U)

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Warhead Technologies: Low Yield Designs

Very-Low-Yield Nuclear Weapons could be very effective and credible counters against future third world nuclear threats

- 10-ton EPW
  - Hold buried C3 at risk
  - Neutralize MOBs by cratering runways
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- 1000-ton battlefield weapon
  - Deter use of mass destruction weapons by third world nations
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Warhead Technologies: Low Yield Designs

W86 PERSHING II EARTH PENETRATOR

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W33 AFAP Modified into a Tactical Low Yield Earth Penetrating Weapon

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DOE 6.2(a)

Warhead Technologies: Low-Yield Designs

A Low Yield Air-Launched Weapon Could Provide Capability to Prevent Overrun of Our Early Entry Forces

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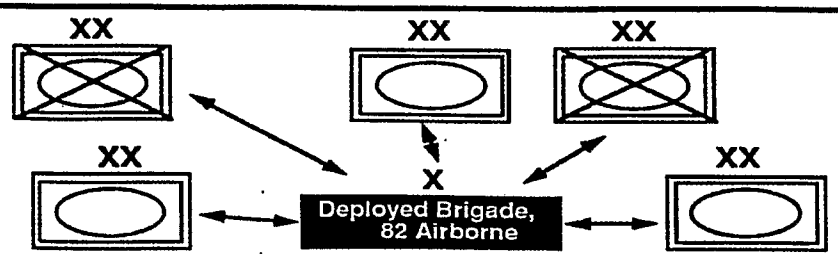
6.2(a)



Hundreds of NSNFs Should Be Maintained and Modernized Within New US National Strategies

As the US Downsizes its Military and Nuclear Warhead Stockpiles, a Nuclear Force Other Than Strategic Weapons Is Needed –

- For NATO forward-deployment
- To deter future nuclear-armed third world adversaries
- To guard against Russian instabilities, and post-USSR relapses and regional spillovers
- For far-term deterrence & insurance

The Nuclear Weapons Laboratories Must Maintain a Broad Level of Competence to Support Future NSNF Needs

D00015619

Laboratory/DOE Briefing on December 17, 1991, to Joint DPB/DSB Task Force on Non-Strategic Nuclear Forces

Attending Members of Task Force

- GEN John W. Vessey, USA, Ret (Former CJCS)
- Dr. Joseph V. Braddock (BDM Intl)
- GEN Andrew J. Goodpaster, USA, Ret (Former USAREUR CDR)
- ADM Huntington Hardisty, USN, Ret
- Dr. Charles A. McDonald
- GEN Donn Starry, USA, Ret
- Ambassador Seymour Weiss

Other Task Force Members: Dr Harold Agnew, Prof Graham Allison, GEN James Dalton USAF Ret, GEN Russel Dougherty USAF Ret, Dr Albert Narath, Dr James Roche

Government Task Force Representatives

- Dr. Robert Barker (OATSD-AE)
- Dr. Everett Beckner (DOE)
- Mr. William Kahn (OSD/TNF)
- MGEN Gerald G. Watson (CDR DNA)

PURPOSE: To brief DOE Laboratories Warhead & Delivery System Technologies for Task Force consideration and use to Secretary Cheney. Expanded to include Perspectives on NSNF Roles.

Laboratories Personnel at Briefing

Los Alamos: Tom Seitz, Frank Smith, Joe Howard
Sandia Albuquerque: Jack Werth, John Anderson
Lawrence Livermore: Kent Johnson

DOE Headquarters: Ev Beckner

Two Hour Briefing:

1. Los Alamos: Introduction, NSNF Roles, Nuclear Warhead Technologies (Common Pit, Multiple-Application Surety Technology, Fieldable Prototypes, Supersafe Designs, Low Yield Designs-- EPW, Battlefield Deterrence)

2. Livermore: NSNF Nuclear Warhead Applications & Effects (EMP, TBMD, Low Yield EPW)

3. Sandia: NSNF Delivery System Concepts (Stealthy Stand-off Bomb, Tactical EPW, Convertible Torpedo, ASRAM, Air-Launched Precision Strike Weapon), Summary

4. DOE: Future Production Complex

Back-Channel Responses

December 17 Laboratories Briefing:

- Excellent, Superb
- Viewgraphs wanted by Task Force

December 19 Task Force with SecDef Cheney:

- Unusual two-hour session, very well-received
- Used Laboratory VGs
- SecDef remains committed to an NSNF capability
- Task Force to prepare report and remain as body for further work

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STRATEGIC PIT RECOVERY

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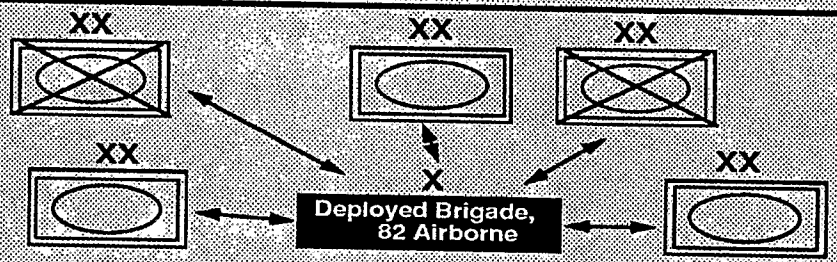

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